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# NEW DESCRIPTIONS

## DESCRIPTION OF A NEW SPECIES OF *TYDEUS* KOCH (PROSTIGMATA: TYDEIDAE) INFESTING THE MEDICINAL PLANT *JUSTICIA ADHATODA* L. NEES WITH A NOTE ON ITS BIOLOGY

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One new species of *Tydeus* Koch (Family: Tydeidae) collected on the medicinal plant *Justicia adhatoda* L. Nees in West Bengal, India, is described here along with its life cycle.

**Key words**: *Tydeus*, new species, medicinal plant, *Justicia adhatoda*, life cycle

### INTRODUCTION

The members of the Family Tydeidae are small, soft bodied and active. These mites occur in a range of habitats including mosses, plants, lichens, soils and stored products. Some are plant feeders, some are predators, and food habits of many are related to honey dew and fungi (Mendel and Gerson 1982). Unfortunately, not much work has been done from the Indian subregion on the taxonomy and biology of Tydeid mites.

The present paper deals with the description and illustrates, along with the biology, of a new species of Tydeid mite of the genus *Tydeus* which is recorded for the first time from the common medicinal plant *Justicia adhatoda* L. Nees (Family: Acanthaceae) from West Bengal, India. Type specimens are deposited in the Entomology and Wildlife Biology Research Laboratory, University of Calcutta, which in due course will be deposited in Zoological Survey of India, Kolkata.

### MATERIAL AND METHOD

Collection and preservation of these mites were done following Gupta (1985). All the measurements given here are in microns.

*Tydeus justicia* sp. nov. (Fig. 1)

**Female**: Propodosoma with four pairs of setae including a pair of sensory setae and hysterosoma with seven pairs of setae. Most of the setae on dorsal surface are thick, slightly curved and appear to be serrate. Striation in the propodosomal region longitudinal. Striation in the region between $d_1$ and $d_2$ transverse anteriorly, and slightly 'V'-shaped posteriorly; striation in the posterior-most region roundish; striation in the lateral region longitudinal. Chaetotaxy of palp and leg chaetotaxy as in Fig. 1. Measurements of body length, width, setae and legs are given in Table 1.

**Male**: Unknown.

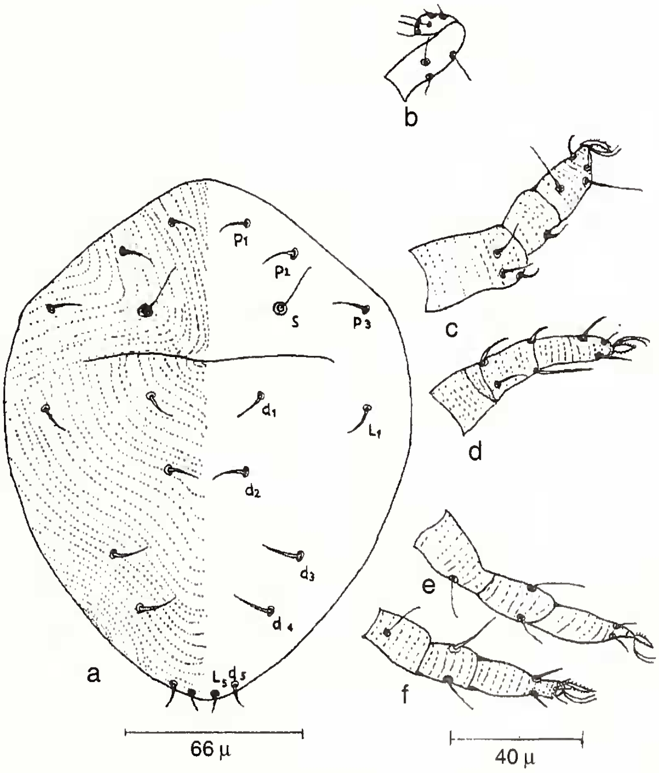

Fig. 1: *Tydeus justicia* sp. nov.:
a. Dorsal view; b. Palp; c. Leg I; d. Leg II; e. Leg III; f. Leg IV

**Material Examined**: Holotype: Female, Experimental Garden, Ballygunge Science College Campus, Kolkata, West Bengal, India, ex. *Justicia adhatoda*, dated: 2.x.2005, coll: Indranil Roy. Paratypes: 3 females, data same as for holotype.

**Etymology**: Named after the host genus *Justicia*

**Remarks**: This specimen resembles *Tydeus wallachi* Gupta and Chatterjee (Gupta 2002). The major differences being hysterosoma with 7 pairs of setae instead of 9 pairs in *T. wallachi*. Striation pattern on both the species differ, setae on legs are relatively shorter and palp chaetotaxy differ. This species also resembles *T. munsteri* Meyer and Ryke 1959, being differences exist in number and relative length of hysterosomal setae, as well as in striation pattern.

Adult individuals of *Tydeus justicia* sp. nov. were collected on *Justicia adhatoda* L. Nees leaf , and were reared in the laboratory for observing the life cycle. To study different developmental stages, the following method was followed. The leaves were cut into bits of 4 cm diameter and kept on a wet cotton pad in a Petri dish (10 cm diameter and 1.5 cm in height). Precautions were taken to remove all the unwanted organisms on the leaves by brushing; the excised leaves were examined under stereo binocular microscope. Then the adult females of *Tydeus justicia* sp. nov. were released (one on each Petri dish) on the leaf bits allowing them to lay eggs. On the next day, the adults were removed from the leaf leaving only the eggs in the petridish. The life cycle study of the mite was observed with the 12 freshly laid eggs of same age. Observations were recorded after every 12 hours to determine the duration of different developmental stages. After hatching, the larvae were lifted carefully with a 'zero' number hair brush and transferred to a previously prepared leaf-disc (at the rate of one larva/ leaf-disc/ Petri dish). The collected data on different developmental stages were subjected to statistical analysis. The study was conducted during September-October 2005 at mean room temperature and relative humidity of 28.03 °C and 83.05%, respectively.

**Table 1**: Measurements of body length, width, setae and legs of female *Tydeus justicia* sp. nov. (in microns)

| Characters | H | PA 1 | PA 2 | PA 3 | Mean |
|---|---|---|---|---|---|
| Body length | 221 | 221 | 222 | 221 | 221.25 |
| Body width | 148 | 146 | 148 | 147 | 147.25 |
| $p_1$ seta | 9 | 9 | 9 | 10 | 9.25 |
| $p_2$ seta | 10 | 10 | 9 | 10 | 9.75 |
| $p_3$ seta | 11 | 11 | 11 | 12 | 11.25 |
| S seta | 13 | 12 | 13 | 13 | 12.75 |
| $d_1$ seta | 13 | 13 | 12 | 13 | 12.75 |
| $d_2$ seta | 10 | 10 | 10 | 10 | 10 |
| $d_3$ seta | 13 | 14 | 13 | 13 | 13.25 |
| $d_4$ seta | 13 | 14 | 14 | 13 | 13.5 |
| $d_5$ seta | 8 | 9 | 8 | 8 | 8.25 |
| $L_1$ seta | 12 | 12 | 10 | 12 | 11.5 |
| $L_5$ seta | 12 | 12 | 12 | 13 | 12.25 |
| 1st leg | 72 | 72 | 72 | 70 | 71.50 |
| 2nd leg | 49 | 49 | 50 | 51 | 49.75 |
| 3rd leg | 66 | 65 | 65 | 66 | 65.5 |
| 4th leg | 69 | 69 | 70 | 72 | 70.0 |

H: holotype, PA 1: paratype 1, PA 2: paratype 2, PA 3: paratype 3

The different developmental stages of *Tydeus justicia* sp. nov. included: egg, one larval stage, two nymphal stages and adult. The fecundity and the duration of individual stages are presented in Table 2.

## Life cycle of *Tydeus justicia* sp. nov.

### Eggs

The eggs were elliptical, about 81µ in length and creamish white. They were laid singly on the under surface of leaves, adjacent to veins. The mean incubation period was 1.33 ±0.14 days.

### Larva

The larva was white, with three pairs of legs. The mean larval period was 2.33 ±0.28 days. The larvae were sluggish and non-feeding type.

### Protonymph

The protonymph was yellow, had four pairs of legs and was more active than the larvae; this period was 1.83 ±0.17 days.

### Deutonymph

The deutonymph was bigger than the protonymph and orange in colour. The mean deutonymphal period was 2.17 ±0.17 days.

### Adult

Adults were slightly bigger than deutonymphs and were red in colour. The adult longevity was 16.5 ±0.95 days.

**Table 2**: Fecundity and duration of different developmental stages of *Tydeus justicia* sp. nov. under laboratory condition

| Stage | Range (in days) | Average (in days) | Duration ± SE (in days) |
|---|---|---|---|
| Egg | 1-2 | 1.33 | 1.33 ±0.14 |
| Larva | 1-5 | 2.33 | 2.33 ±0.28 |
| Protonymph | 1-3 | 1.83 | 1.83 ±0.17 |
| Deutonymph | 1-3 | 2.17 | 2.17 ±0.17 |
| Egg to Adult | 5-10 | 7.67 | 7.67 ±0.47 |
| Adult | 12-22 | 16.5 | 16.5 ±0.95 |
| Fecundity | 6-11 eggs | 7.75 eggs | 7.75 ±0.69 eggs |

### Egg to Adult

The mean duration of egg to adult period was 7.67 ±0.47 days.

### Fecundity

The average total fecundity was 7.75 ±0.69 eggs in the species studied.

## DISCUSSION

The life cycle of *Tydeus justicia* sp. nov. reached adulthood in about 8 days on the host plant *Justicia adhatoda*, whereas in the related species *Tydeus californicus* it took about 12 days on two host plants *Weigela* sp. and *Vitis vinifera* L. Sangiovese (Liguori *et al.* 2002). In the present experiment, the average fecundity appeared to be very poor as evident from the fact that it was only 7.75 ±0.69 eggs per female. As per Liguori *et al.* (2002), *Tydeus californicus* viviparously generates 26 larvae in her life span of about 44 days on grape and 32 larvae in about 48 days on *Weigela* sp., respectively. On the other hand, it is apparent that the life cycle of *Tydeus* species takes almost similar time as that of Tetranychid mite (Gupta 1985) and Phytoseiid mite (Gupta 2003), but in case of Tenuipalpid mite, the life cycle takes much longer time than these mites, where the mean time taken from egg to adult period was 11-26 days (Jeppson *et al.* 1975) in case of *Brevipalpus obovatus*.

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